THE WINDOW

THE INDIAN ARSENAL

AN AMERICAN economic commission led by Dr. Henry Grady recently spent some time in India. Its purpose was to investigate the industrial development of the country on the spot, as well as to study the measures to be taken in order to effect a considerable increase in India's production of war material. The members of the Grady Commission carried out protracted negotiations with Indian industrialists in Bombay and Calcutta. As far as anything has become known about these discussions, it appears that the Americans have indicated that most of the Indian methods of manufacture were obsolete, and that for this reason the entire industry was in need of a thorough reorganization if a considerably increased production was to be achieved. The American commission therefore suggested that a large number of American experts and technicians be sent to India to organize Indian industry after the American pattern.

Naturally England and America are deeply interested in extending India's war-industrial potential. Above all, it would mean considerable relief for their own strained war industry. But beyond that the supply of war material to India is also a question of transport, and, in view of the increasing Axis menace to the international routes of shipping, this question has grown to a problem of the first order for the Anglo-American side. If it should be possible to reorganize Indian industry in the manner suggested by the Grady Commission, the ensuing increase in war production would not only benefit the Anglo-Saxon position in India, but would also make it possible to supply the USSR, the Middle East, and Africa from India. These areas could more or less all be reached from India by land, which would eliminate the present great risk of sinkings. But the British are now grievously feeling the effects of their former policy of restraining India's industrial development in order to maintain India as a market for Britain's industrial production.

In view of the present Anglo-American endeavors, it is interesting to present a survey on the extent of this Indian industry and what it has produced so far in the present war. We must, however, emphasize the fact that the figures on the industrial development in India and especially on the production of war material are comparatively incomplete, since it is very difficult to obtain reports on these figures from India.

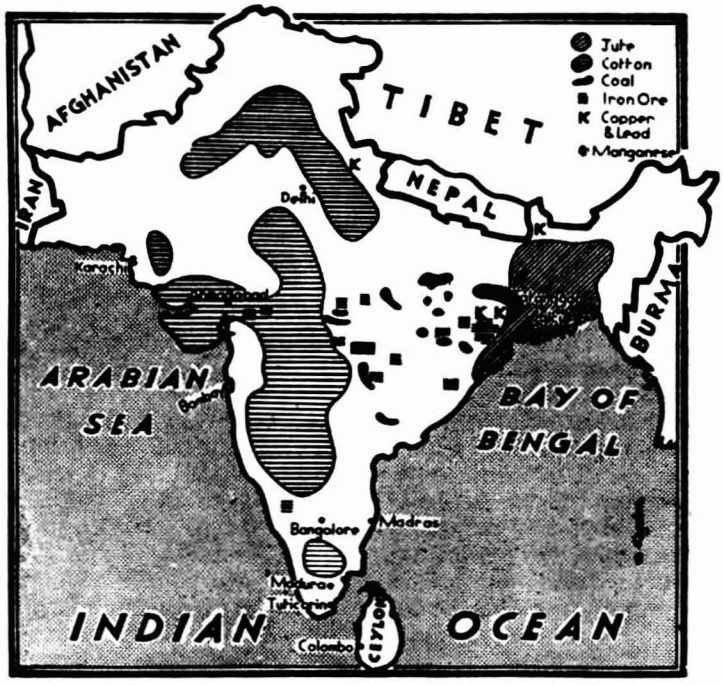
HUGE RESERVES OF RAW MATERIAL AND LABOR

It is generally known that India's industrial development had made considerable progress before the outbreak of this war. But India is still above all an agricultural country and will remain so for a long time to come. Up to the outbreak of war, about seventy per cent of her population of 360 millions subsisted on agriculture and cattle raising. Nevertheless, the prerequisites for a large-scale industrial development of the Indian continent doubtless exist. The country is rich in minerals of all kinds, such as coal, iron and manganese ores, bauxite, copper, lead, gold, and mica. The chief products of Indian agriculture are cotton, jute, hemp, and various oil seeds, among which especially the latter are very important, since fats and oils necessary for the war industry are obtained from them. And finally, India also possesses a vast reservoir of men which supplies cheap labor.

When war broke out in September 1939, the British immediately went to work to adjust Indian industry to war requirements. This time they had the advantage of the experience gained during the last war, when India supplied the Allies with large quantities of ammunition.

An "Eastern Supply Board" was created in New Delhi whose task it was to establish connections between Indian industry and the various customers in the British Empire. The Eastern Supply Board supervises the "Ordnance Factories" established in the

various centers of production. These factories serve exclusively for the production of war-essential materials. They have partly arisen through the adjustment of existing industrial plants and are partly entirely new erections. The Ordnance Factories work according to exact specifications supplied by the Eastern Supply Board. According to available information, more than 20,000 different war-essential articles were manufactured in these plants as early as three months after the outbreak of the war. Moreover, the majority of these articles are made from raw materials obtained in India.



IRON AND STEEL

The foundation of any war industry is the iron and steel production of a country. In India it showed the following development:

INDIA'S IRON AND STEEL PRODUCTION

(in tons per annum)

Year	*Pig Iron*	*Steel*
1913	267,000	
1938/39	1,538,000	966,000
1939/40	1,838,000	1,066,000

These figures are enough to show that Indian industry began this war with a raw-material basis which enabled it to surpass the war production of 1914/18 by many times.

Besides iron and steel, India produced (in 1936):

22,611,000 tons of coal,
813,000 ,, ,, manganese ore,
72,000 ,, ,, lead.

The production of manganese ore has meanwhile reached one million tons per annum, and the figures for coal and lead must also have risen.

In spite of the great increase experienced by the iron and steel production, this latter did not even suffice before 1939 to cover the peace-time requirements of the country, especially in construction steel. It was therefore necessary to import considerable quantities of manufactured iron and steel, such as steel supports, steel bars and angles, steel sheets, wire and cable, rails, etc., from overseas, mainly the European continent (Germany, Belgium, and France) as well as England and America.

With the outbreak of war, the import of manufactured iron and steel from the European continent naturally came to a complete stop. The imports from England and America also declined considerably, as both these countries needed their production for themselves, and, in addition to this, the growing scarcity in shipping space rendered the question of transport very much more difficult. A further complication for India arose from the fact that England on her part now made claims on the Indian production of pig iron. For instance, since September 1940, 50,000 tons of pig iron have been supplied every month by India to England, where this iron has been used in the armament industry. So, at the beginning of the war, India was faced by the problem, not only of covering her growing requirements in iron and steel from her own production, but also, beyond that, of supplying raw materials to England. Since production could naturally not be immediately increased to such an extent that the lack of

imported materials could be compensated for, the result was that consumption in India was sharply curtailed. Soon after the outbreak of war, the Indian Government decreed that construction steel for civilian building purposes could no longer be supplied, and that therefore any building activity serving nonmilitary purposes could not be undertaken if iron or steel were required for it.

Although Indian pig-iron production had in 1940/41 passed the two-million-ton mark, this production still does not suffice to cover the growing requirements caused by the war. A considerable share in the increase in production of the last few years has been contributed by the well-known Tata iron and steel works in Tatanagar (Northeast India), where modern electric furnaces have recently been erected. A single one of these furnaces is said to have a daily capacity of 1,700 tons.

INDIAN BOMBS AND RIFLES

According to available information, the following war materials are being produced at present in British India: artillery and infantry ammunition of various calibers—aviation bombs—depth charges—hand grenades—machine guns—rifles—pistols—bayonets—light and heavy artillery—antiaircraft guns—armor plates—steel helmets—wire and cable—tools of all kinds.

Armor plates according to British standard specifications have been manufactured for some time from a special steel alloy which is supposed to be bulletproof. These armor plates are being used mainly in the building of tanks. The large and varied tool requirements of a modern motorized army are being filled to a great extent by the Tata concern, which supplies the army with a monthly quantity of some 50,000 such tools. When Germany began to lay magnetic mines in the waters around England, a sudden great demand arose for cables needed for demagnetizing British ships. India supplied part of these cables.

SHIPS AND ALUMINUM

The Indian shipbuilding industry, which was hardly developed at all before the war, has been faced by entirely new tasks as a result of the war. Up to 1939, the dockyards of Calcutta and Bombay were occupied mainly with the repair and overhaul of foreign ships calling at those ports. India did not possess a merchant fleet of her own, and most of the few coastal vessels needed to protect and patrol the Indian coast were also built in Great Britain. The war has caused a change in this situation. The Indian dockyards are now equipped to build fair-sized oceangoing vessels, and, although boilers and engines are still being supplied by England and America, hulls and other constructions are already being built in India from Indian materials. India is now building small gunboats for coastal patrol, as well as transport vessels which are chiefly to supply transport along the coasts of India and between Ceylon and India.

It is an interesting fact that India has also already taken up the manufacture of light metals, especially of aluminum and its alloys, which play so great a part in the airplane industry. There are already several aluminum rolling mills in India, and a large rolling mill has just recently been placed in commission. Before the war, the production of aluminum within the country was not given much attention, although there are sufficient quantities of bauxite, the raw material from which aluminum is obtained. The rolling mills working in India before the war therefore mainly used imported aluminum. Here, too, the war has effected a change in that the Indian factories now exclusively use aluminum produced in India.

PLANES AND TRUCKS

Beside the British Air Force squadrons stationed in India, the war has also created an "Indian Air Force." This has made the manufacture of airplanes an acute problem. Hitherto, airplanes were assembled in India from parts imported mainly from America. Now, however, the large-scale manufacture of bombers and pursuit planes is to be undertaken as far as possible with Indian materials. For this purpose, the Indian Aircraft Company, capitalized at £3,750,000, began last year with the erection of a modern aircraft factory in Bangalore (Mysore State), which must meanwhile have been completed. Here airplanes for the Indian Air Force are to be manufactured under the supervision of American engineers and technicians.

In this connection we must also mention the Indian automobile industry. General Motors as well as Ford have maintained assembly plants at various places in India, for instance, in Bombay, since before the war. Since the outbreak of war, no automobiles whatever for civilian use have been manufactured, and the entire equipment has

been adjusted to the manufacture of vehicles for the army. The main production is devoted to trucks and light armored cars. Plans have been made to enlarge the existing plants considerably, and it is expected to produce an additional supply of at least 25,000 vehicles of all kinds per annum for the army.

CHEMICALS AND OIL

The development of India's chemical and pharmaceutical industry is also worthy of note. The leading concern is the Imperial Chemical Industries (India) Ltd., which manufactures a number of war-essential chemicals in India, such as ammonia, sulphuric acid, chlorine, nitroglycerin and other chemicals used in explosives. Some pharmaceutical preparations which had formerly to be imported are now being produced in India, especially a number of drugs and serums needed for combating epidemics, as well as chloroform and carbolic acid.

It is also interesting that there are plans to start the synthetic production of gasoline from coal. For this purpose, a fairly large plant is being erected in Tatanagar, the production of which is to alleviate the difficult motor-fuel situation in India. Owing to the occupation of Burma by the Japanese, India has been cut off from one of her most important sources of motor fuel. Up to the outbreak of the war, India obtained an annual quantity of approximately 800,000 tons of kerosene and fuel oil from Burma. Since she has no important oil wells of her own, India is now entirely dependent on the import of oil from the Middle East. The shortage of motor fuel, especially of diesel oil, has made itself felt in industry. For that reason, strict rationing measures have been introduced on the one hand, while, on the other, substitute fuels are being sought for. For instance, it was recently reported that in some factories diesel oil has been replaced by peanut oil, which is said to have already proved itself in the running of high-speed diesel motors. Peanut oil is available in abundance in the Madras Presidency, since the export overseas, which before the war was very extensive, has now been almost completely cut off. Furthermore, endeavors are being made to build up the manufacture of lubricating oils suited for aviation and automobile motors.

SIRENS AND BOOTS

Great progress has been made by India's electrical industry, which now produces a large number of articles that formerly had to be imported. Among them are: electric motors—air-raid alarm sirens—dry batteries —insulators—electric-light bulbs — fans — switches—etc.

Another branch of Indian industry, from which England especially has benefited since the beginning of the war, is the leather industry. Even before the war, India's trade in skins was very important. While, however, a large part of these skins were formerly exported, the majority are now finished in the country itself. Thus India supplied England during the first year of the war with an average of 125,000 pairs of army boots per month. Furthermore, large quantities of saddles and harness have been manufactured there.

KING COTTON

Beside America and Egypt, India is a leading cotton-producing country. Indian raw cotton has always been a great export article. Long before the outbreak of the present war, however, an industry had developed in India which spun her cotton into yarn and finally wove material out of the yarn. The Indian textile industry had in the past to pass through several grave periods of crisis which can be traced, on the one hand, to the inadequate methods of manufacture and, on the other, to Japanese competition. The latter was fought off with high import duties and quotas. But this was not enough to ensure prosperity for the Indian industry. The obsolete methods of manufacture noted recently by the Grady Commission in most of the factories of India apply just as much to the textile industry. Meanwhile, the war has wrought a change here, too, and today most of the plants are so occupied with army orders that something of a boom has set in for the Indian textile industry.

In 1937 there were approximately 370 cotton-spinning and weaving mills throughout India, with some 9,731,000 spindles (world total: approximately 165 million spindles) and 198,000 looms. The largest number of textile plants is to be found in the Bombay Presidency, where there are 210 mills with altogether 6,100,211 spindles and 141,471 looms. The total cotton-yarn production of India in 1937/38 amounted to approximately 1,159,513,000 pounds. A considerable share of this was produced in the Madras Presidency, where there are large cotton mills in Madras, Madura, and Tuticorin. These mills

are under English management and possess modern dyeing works. During the first year of the war, India sent approximately 10 million yards of khaki material for uniforms overseas.

In the meantime, a very important industry for ready-made clothing has also arisen. In addition to large quantities of uniforms for the army, these plants supplied approximately 1,200,000 cotton shirts, 2,000,000 pairs of socks, and 1,500,000 cotton blankets during the first year of the war. By far the greatest part of this production went to the British and Indian troops in Africa, Burma, and Malaya.

SANDBAGS AND SILKWORMS

Besides pure cotton materials, which take up the largest share of the Indian textile production, mixed materials are also manufactured, made from cotton and silk as well as cotton and wool. The Indian wool production amounts to approximately 60 million pounds annually (whole world, 1939: 4,010 million pounds); however, its quality is inferior and cannot by any means be compared to Australian wool. It is used mainly for the manufacture of Indian woollen carpets. It is interesting to note that a material is also being produced in India which is made of cotton and jute and which is said to be very durable. This material is being used, among other things, for the manufacture of tents. India is the greatest producer of jute in the world, and about 85 per cent of this production comes from Bengal Province, where there are innumerable jute factories on the banks of the Hooghly River near Calcutta. The Bengal jute industry has supplied large quantities of sandbags during this war to the various parts of the Empire, where they are used as a precaution against air raids. Quite recently, the British Government placed a huge order for jute sacks with the association of jute producers in Calcutta, and the carrying out of this order will occupy the industry for some time to come.

The silk industry is a very old one in India. It had, however, lost much of its importance before the war under the pressure of Japanese competition. Since Japanese silk is not available at present, the Government has lately been encouraging the culture of silk worms again, as silk is needed for the manufacture of parachutes and has thus become war-essential.

In order to create additional raw material for the textile industry, the cultivation of flax has recently been very much encouraged. In the provinces of Behar and Bengal, for instance, the amount of four million rupees has been allotted to the cultivation of flax.

RELUCTANT ARSENAL

As we have shown, Indian industry has developed into a notable factor in the supply system of the Anglo-American powers. The industrial potential of India has by no means been exhausted yet, and much remains to be done if the hopes of the British and Americans regarding the industrial development of the country are to be fulfilled. It is obvious that a completely modern and efficient industry, as especially the Americans would like to have it, cannot be conjured up from one day to the next, above all, not in a country like India, where a large part of the population regards the idea of transforming India into an arsenal for the democracies with indifference, if not with distaste. At the very best, it will take some considerable time before all the plans and projects aiming at an increase of industrial production in India can be realized. Indeed, as a result of the political developments of the last few weeks, it now seems doubtful whether even the present level of production can be maintained.

Furthermore, the Japanese advance has meanwhile reached the borders of Assam and Bengal through Burma. From the positions now held by the Japanese, bombers could easily reach the heart of the northern Indian industrial area in Behar and Bengal, which contains India's coal mines and her most important iron and steel works. Even Calcutta, the seat of important industries, is threatened directly, as it can also be reached by sea with comparative ease.

One thing is sure, and that is that the development which the British and Americans have, by force of circumstance, set in motion in India, will be of tremendous influence on India's industrial activity after the war. As a matter of course, this will also have its effect upon the extent and nature of the trade between India and the rest of the world.—W.J.